Precalc Warm Up #4 - 5

Find the values of m and c, such that this system:

$2x - my = c$

$6x + 12y = 25$

has: a) no solution

b) infinite solutions

HW Questions? p. 120

EXERCISES 5.2

1. A function is defined as follows, $f: x \mapsto 2x + 3, x \geq 0$.

(a) Find the value of $f(0),\ f(1)$.

(b) Evaluate the expressions i. $f(x+a)$ ii. $f(x+a) - f(x)$

(c) Find $\{x : f(x) = 9\}$.

2. If $f(x) = \frac{x}{x+1}$, $\boxed{x \in [0, 10]}$, find (a) $f(0),\ f(10)$.

(b) $\{x : f(x) = 5\}$.

(c) the range of $f(x) = \frac{x}{x+1}, x \in [0, 10]$.

$\underbrace{}_{11}$

$x = -\frac{5}{4}$

is outside our domain!

3. For the mapping $x \mapsto 2 - \frac{1}{2}x^2, x \in \mathbb{R}$, find

$f(x) = 2 - \frac{1}{2}x^2$

(a) $f(x+1)$, $f(x-1)$.

(b) a, given that $f(a) = 1$.

(c) b, given that $f(b) = 10$.

outcome = 10

$f(x) = -\frac{1}{2}x^2 + 2$

$f(x+1) = -\frac{1}{2}(x+1)^2 + 2$

$= -\frac{1}{2}(x^2+2x+1) + 2$

$= -\frac{1}{2}x^2 - x - \frac{1}{2} + \frac{4}{2}$

$= -\frac{1}{2}x^2 - x + \frac{3}{2}$

$2 - \frac{1}{2}b^2 = 10$

now solve for b.

4. A function is defined as follows, $y = x^3 - x^2$, $x \in [-2, 2]$. domain

(a) Find the value(s) of x such that $y = 0$.

(b) Sketch the graph of $y = x^3 - x^2$, $x \in [-2, 2]$ and determine its range.

a) $0 = x^3 - x^2$

$0 = x^2(x-1)$

$x = 0, 1$, check $x \in [-2, 2]$

yes, so both solutions work.

5. The function f is defined as $f :]-\infty, \infty[\mapsto \mathbb{R}$, where $f(x) = x^2 - 4$.

(a) Sketch the graph of i. f

ii. $y = x + 2, x \in]-\infty, \infty[$

(b) Find i. $\{x : f(x) = 4\}$ ii. $\{x : f(x) = x + 2\}$

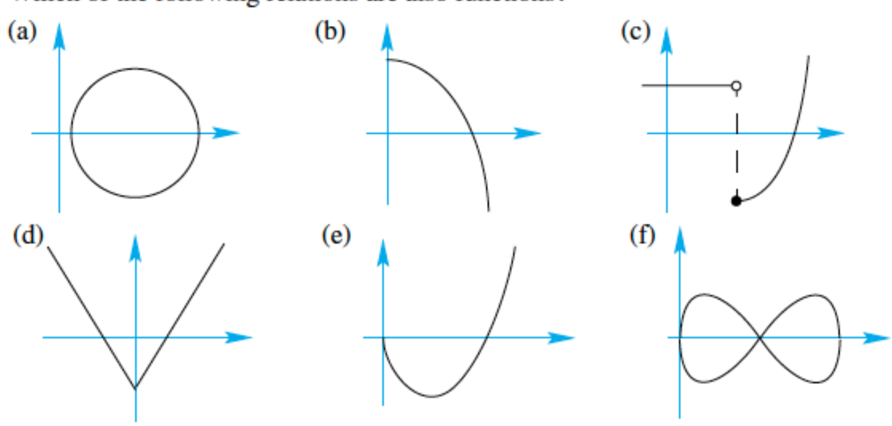
$x^2 - 4 = x + 2$

$x =$

a ii) sketch $y = x + 2$, $x \in]-\infty, \infty[$ means all reals.

Surely you can graph this line. :)

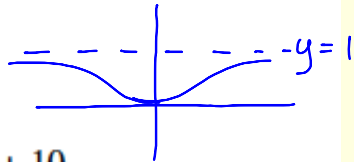
6. Which of the following relations are also functions?



9. Sketch the graph of $f: \mapsto \frac{x^2}{x^2+2}$, $x \in \mathbb{R}$ and use it to

(a) show that f is a function.

(b) determine its range.

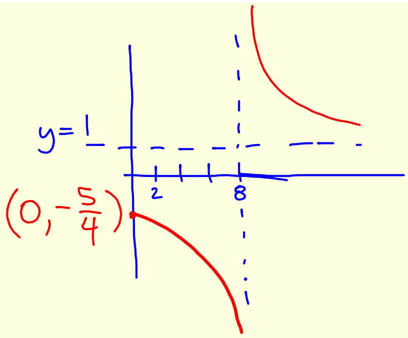


$0 \leq y < 1$

10. A function is defined by $f: x \mapsto \frac{x+10}{x-8}$, $x \neq 8$ and $x \geq 0$.

(a) Determine the range of f.

(b) Find the value of a such that $f(a) = a$.



a) $\left(-\infty, -\frac{5}{4}\right] \cup (1, \infty)$

b) $a = \frac{a+10}{a-8}$

$a(a-8) = a+10$

$a^2 - 8a - a - 10 = 0$

$a^2 - 9a - 10 = 0$

12. Which of the following functions are identical? Explain

(a) $f(x) = \frac{x}{x^2}$ and $h(x) = \frac{1}{x}$.

(b) $f(x) = \frac{x^2}{x}$ and $h(x) = x$.

$x \neq 0$

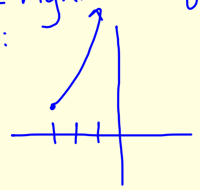
x can $= 0$

so f & h are not identical!

13. Find the the largest possible subset X of $\mathbb{R}$ so that the following relations are one to one increasing functions

(a) $f : X \to \mathbb{R}$, where $f(x) = x^2 + 6x + 10$

function is increasing on the right side of the vertex:



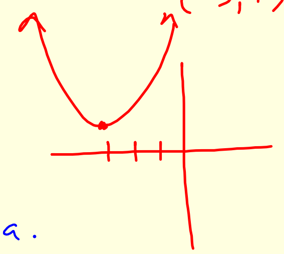
$x > -3$

graph it:

vertex $x = \frac{-6}{2} = -3$

$y = 9 - 18 + 10 = 1$

$(-3, 1)$



* for one-to-one, must restrict to only $\frac{1}{2}$ the parabola.

The next few slides should help you review for next week:

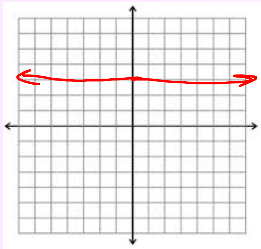
Transformations of some basic and not so basic graphs.

Tonight's homework is a review worksheet and it follows the homework slide if you need to print it off.

You should know what the graphs of some basic functions look like:

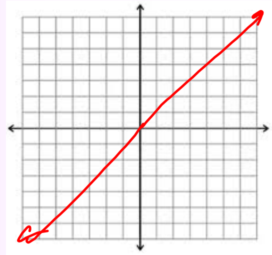
Ex: $f(x) = 3$

Constant: $f(x) = c$

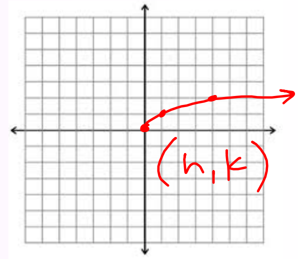


$y = x$

Identity: $f(x) = x$

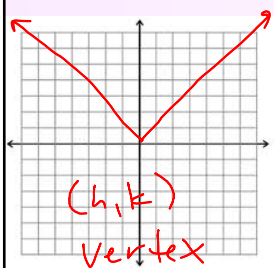


Square root: $f(x) = \sqrt{x}$



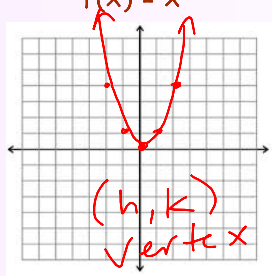
Absolute Value:

$f(x) = |x|$



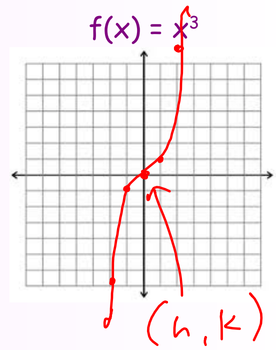
Squaring function:

$f(x) = x^2$



Cubing function:

$f(x) = x^3$

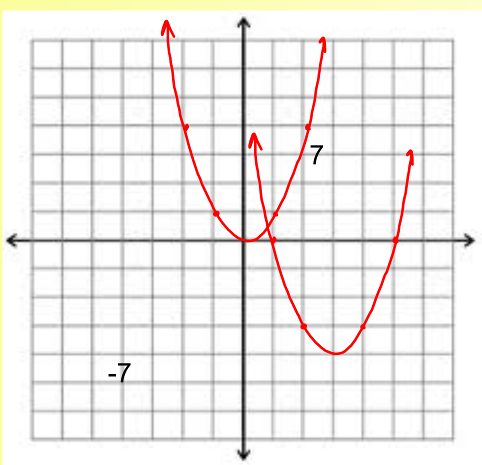


What will $f(x) = (x - 3)^2 - 4$ look like?

Rt 3

down 4

Parent Graph:



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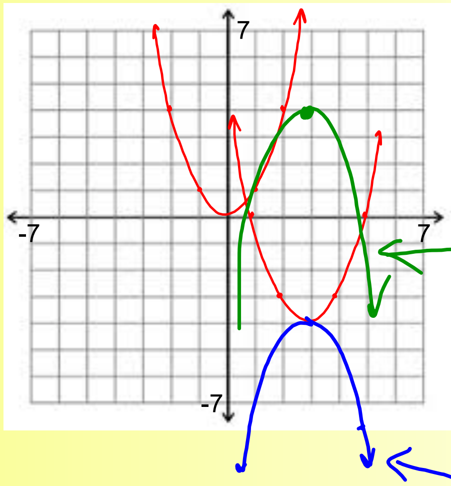
Describe the transformations of the parent graph that result in:

$f(x) = -(x - 3)^2 - 4$

R+3 down 4

reflect across x-axis



"

if reflected last, didn't work

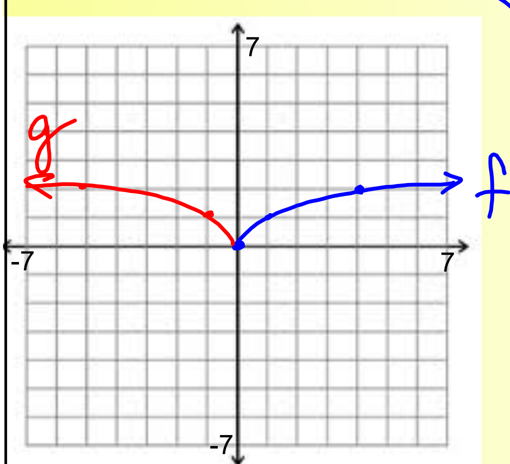
correct.

so: order of transformations matters!

How does $g(x) = \sqrt{-x}$ compare to $f(x) = \sqrt{x}$?

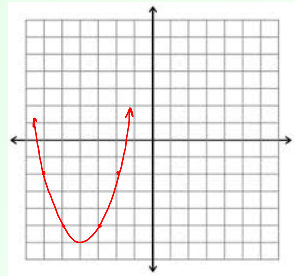
reflect in y-axis

r_y



Rigid Transformations

Graph $g(x) = (x + 4)^2 - 6$

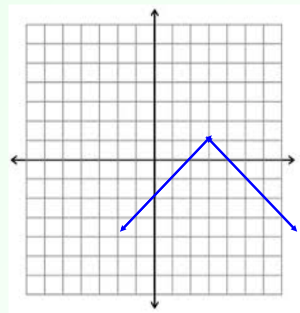


Describe transformations:

If $f(x) = x^2$,

then $g(x) = f(x+4) - 6$

Graph $t(x) = -|x-3| + 1$



If $f(x) = |x|$,

then $t(x) = -f(x-3) +1$

SUMMARY

Translations: $h(x) = f(x + 2) + 3$

horizontal shift: left 2

vertical shift: up 3

Reflections:

r_x

$h(x) = -f(x)$

reflect over the x axis

r_y

$h(x) = f(-x)$

reflect over the y axis

HW: Review worksheet

The scanned worksheet follows this slide.

PreCalc SL Review Homework

Name________________

Per. ___ Team # ___

1. Solve the system, show work algebraically.

$$\begin{cases} 3x+5y=-1 \\ -2x+2y=-10 \end{cases}$$

1.________________

2. Find m and c so that the system: $\begin{cases} 3x-4y=-10 \\ 9x+my=c \end{cases}$

has a) no solution

2a)________________

b) infinite solutions

b)________________

3. Solve, show work algebraically.

a) $x+3=\frac{28}{x}$

b) $x(x+8)=-7$

3a)________________

b)________________

4. Find k for which $2x^2+kx+2=0$

has a) one real solution

4a)________________

b) 2 real solutions

b)________________

c) no real solution

c)________________

5. Put in turning point form and hence find the vertex.

$y=3x^2+12x+17$

5.________________

vertex:__________

6. Find the equation of the parabola with x-intercepts at -4 and 3 and y-intercept at -6.

6.________________

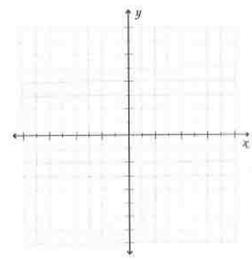
7. Solve. Express answer in interval notation.

$2x^2+x-1<0$

7.________________

8. Graph the functions on the same set of axes, then solve: $f(x) < g(x)$.

$f(x) = x - 5$ and $g(x) = x^2 - 6x + 5$

8. 

8. solution:________________

9. Find m so that the line is tangent to the parabola.

$y = 2x + m$

$y = x^2 + 3x - 5$

9.___________________